# smart

## SERVICE MANUAL

EUROLyser DIAGNOSTICA

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# INTRODUCTION

## About this manual

This service manual will guide you through the various service options of your Eurolyser laboratory photometer.

It is recommended that you become familiar with the service manual before you start performing any service operations with the Eurolyser smart laboratory photometer.

Some of the information in this User Manual is accompanied with a symbol that points you to the following particulars:

Operator's handling

Warnings and precautions

Consult the user instructions

# *Firmware*

## Important notices regarding the firmware update

- When processing a firmware update all results are deleted
- When processing a firmware update all settings are set to default (e.g. units, norm values, language, …)
- When using the USB interface please make sure before starting the firmware update that the driver has been installed correctly. (Check if the Eurolyser smart is enlisted in the device manager at section "Ports (COM and LPT)")
- It is recommended to use the latest firmware-update-files available. They can be found at www.eurolyser.com

## FW-Requirements / Recommendations

- It is recommended to use firmware version v1.17 or higher
- To run an optional language package (excluding English/German) it is necessary to run firmware version v1.14 or higher: **Warning!** Due to a bug up to and including firmware version v1.18 it is strongly recommended to run v1.19. (Bug description: If number of measurement results exceed 94 the optional language package is deleted)
- The thermo-printer is supported starting at version v1.08.
- The barcode reader is supported starting at version v1.09.

## Interfaces

- It is recommended to use the RS232 interface instead of the USB interface (no driver installation necessary).

# *Troubleshooting*

## USB-Driver problems

When encountering difficulties with the USB driver please follow these steps:

- Disconnect the USB connection
- Start up the device manager and make all devices visible (including not connected)
- To make all devices visible (including not connected):
  - Follow these steps:
    - Create a new system-wide environment variable:
      Name: `DEVMGR_SHOW_NONPRESENT_DEVICES` Value: `1`
    - Start up the device manager
  - ***Alternatively*** run the following commands at the shell (cmd.exe):
    - `C:\> set DEVMGR_SHOW_NONPRESENT_DEVICES=1`
      `C:\> start devmgmt.msc`
- In the device manager window „View → Display Hidden Devices "
- In section „Ports (COM and LPT)" uninstall all entries that are named „Eurolyser smart (VCP) (COMx)" or „USB Serial Port (COMx)" (x is a number between 1 and 255)
- In section „ USB-Controller " uninstall all entries that are named „ Eurolyser smart " or „ USB Serial Converter "
- Restart the PC
- Reconnect the smart with the PC and reinstall the drivers again.

- The Firmware-Update-Tool won't find the smart in case the COM-Port exceeds COM10.
  - Lower the COM-Port at the device manager.

# TROUBLESHOOTING

| Error Message | Reason (User manual) | How to correct (User manual) | Point in time / Screen | Remarks | Additional reason(s) / Further information | Checking | How to correct |
|---|---|---|---|---|---|---|---|
| - Invalid Card | wrong, defective or expired RFID card | use a new test kit | Main screen | | Trying to perform a test which is not compatible with the wavelength of the device. | Check device typ (wavelength is noted on label over door) and check test type. | |
| | | | | | Update with wrong firmware update file. | Check device typ (wavelength is noted on label over door) and logo on main screen. | Perform firmwareupdate with correct firmwareupdate file |
| | | | | | Defective RFID-Module | Results in lagged response times on the main screen. | Correction done at factory |
| - No Results | no test results stored | perform test | After measurement | | Up to firmware version 1.16 the result was not displayed or saved if no ID (patient input) was specified. | | Perform firmwareupdate to latest version |
| | | | Result screen (called from main screen) | | When performing a firmware update all results are deleted, settings are set to default values. | | |
| - Calibration failed | calibration values out of acceptable range | repeat calibration with new test kit or new calibrator kit | After calibration | | | | |
| - Tests expired | test cartridge has passed expiration date | repeat the test using a new sample and a new test cartridge from another test kit | Main screen | | Maybe wrong date/time input. | Check date/time settings; Firmware-Version v1.09 - or higher - displays the current date on the main screen in case no RFID card is inserted. If running a FW before v1.09 check date in the settings menu. | Set correct date settings |
| - Kalibration required | calibration interval exceeded | perform new calibration | Main screen | Depends on test (at the moment not implemented) | | | |
| - Door blocked | test cartridge blocks the test lid because the cartridge has not been inserted completly or the cap has not been applied to the cuvette firmly | reposition the test cartridge, apply cup firmly to cuvette | | | Device error: Door motor has not enough power (Door opens or closes not completely) | Self test menu | Correction done at factory |
| - Wrong Cap<br>Missing Cap<br>Missing Cartridge | incorrect ERS cap is applied or ERS cap is missing or cartridge is missing | use correct ERS cartridge and cap | After start of test (after inserting the cartridge) | 1. Detection possibility: Cap sensor | Device error: Cap sensor is dirty | Self test menu | Clean sensor with little alcohol on cotton bud |
| | | | | | Device error: Cap sensor energy not ok | Sensor test menu | Correction done at factory |
| | | | After adding R2 | 2. Detection possibility: Current consumption of bolt actuator. (Error implemented beginning at Firmware-Version 1.17; Current has to rise above a specified limit – it won't if an already used or no ERS cartridge is used.) | Device error: Bolt loosely | Test Motors Menu: ‚Bolt down' with new ERS cap -> upper seal won't be pushed down completely to the end of the ERS cap. | Correction done at factory |
| - Bolt blocked | test cartridge blocks the bolt because an incorrect ERS cap is applied | use correct ERS cartridge and cap | After adding R2 | | Device error: Door catch misadjusted -> Door is moved too much into the device | Test Motors Menu: Press ‚Door open' and afterwards 'Door close' -> Door does not flush with case (bends inside) | Correction done at factory |
| - Measurement Overflow | photometric measurement value is out of range (e.g. if a cold cartridge is used) | repeat the test using a new sample and a new cartridge | During measurement | No energy at receiver of photometer (Value >= 5000mOD) | Beam blocked | Test Photometer Menu and optical check | Clean sensor with little alcohol on cotton bud |
| | | | | | LED is not illuminated | Test Photometer Menu and optical check | Correction done at factory |
| | | | | | Update with wrong firmware update file | Check device type (wavelength(s) noted on label over door) and check logo on main screen. | Perform firmwareupdate with correct firmwareupdate file |
| - Blank Error | photometric measurement value is out of range (without cartridge) | repeat the test after switching power off and on | After start of test (before inserting the cartridge) | Insufficient energy at receiver of photometer (Value > 1000mOD) | Beam blocked | Test Photometer Menu and optical check | Clean sensor with little alcohol on cotton bud |
| | | | | | LED is not illuminated | Test Photometer Menu and optical check | Correction done at factory |
| | | | | | Update with wrong firmware update file | Check device type (wavelength(s) noted on label over door) and check logo on main screen. | Perform firmwareupdate with correct firmwareupdate file |
| | | | | Too much energy at receiver of photometer (Value < 10mOD) | Update with wrong firmware update file | Check device type (wavelength(s) noted on label over door) and check logo on main screen. | Perform firmwareupdate with correct firmwareupdate file |
| - Temperature Error | temperature is out of range | repeat the test after switching power off and on | After start of test | | Trying to process measurement shortly after the warm up has been aborted (approx. <15 min, depends on room temperature) | Test Temperature Menu | |
| - Wrong Sampletype? | maybe incorrect sample type is used | select correct sample type | After end of test | - Depends on test. There exist two | | | |
| | | | | 1. Sampletype ‚serum' is chosen: If sample blank value exceeds a specified limit (saved on RFID card) the message appears and it is possible to switch to 'whole blood'. | A too high sample blank value may also be caused by a (too cold) cartridge covered with condensation | | Perform test again with new cartridge |
| | | | | 2. Sampletype ‚whole blood' is chosen: If sample blank value is below a specified limit (saved on RFID card) the message appears and it is possible to switch to ‚serum'. | | | |
| - Linarity Error | kinetic reaction is not linear (e.g. if a cold cartridge is used) | repeat the test using a new sample and a new cartridge | After end of test | | | | |

# TROUBLESHOOTING

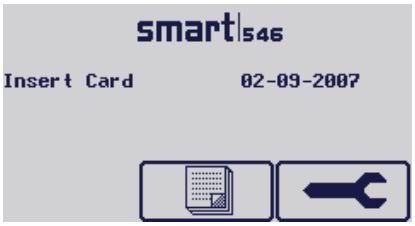
| Fault scenario | Remarks | Additional cause(s) / Further information | Verification / Check | Correction |
|---|---|---|---|---|
| - Message 'Remove Cartridge' altough the cartridge is removed. | Cap sensor | Device error: Cap sensor dirty | Sensor Test Menu | Clean sensor with little alcohol on cotton bud |
| | | Device error: Cap sensor energy not okay | Sensor Test Menu | Correction done at factory |
| - Touchscreen won't work correctly | | | e.g. Password input after 'Service' | Perform touchpanel adjustment |

## Touchpanel Adjustment

1. Switch off the Eurolyser smart.
2. Touch the display; while keeping it touched turn on the smart.
3. On the display it says „***touch adjustment?***“
4. Release the touch screen short (about 0,5 seconds) and touch it again by pressing it at least 1 second
   ***Attention:*** ***If the display initialization has not been processed correctly the Eurolyser smart will start up in normal mode. If this has happened please start again on step 1. Some practice may be needed to accomplish this step.***
5. Follow the instructions to adjust the touch panel:
   ***Tip:*** ***If available use a tool (best possible: rounded plastic pen) to achieve a precise adjustment.***
   ***Attention:*** ***Do not scratch the damageable display surface.***
   a. Touch blinking dot in upper left corner
   b. Touch blinking dot in bottom right corner
6. After the adjustment has been processed successfully please restart the smart (disconnect power supply and reconnect again)
7. The touch screen is now adjusted.

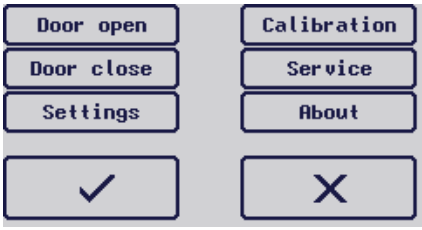
**smart service menu overview**

1. Start-up menu



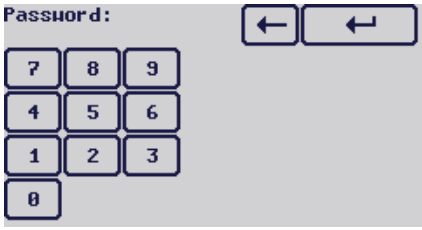

Touch to get to the Settings menu

2. Settings menu



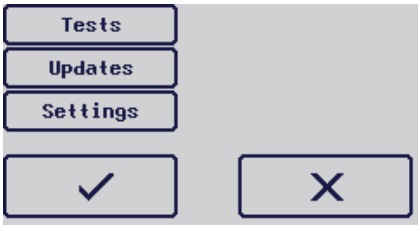

Touch **Service**

3. Password menu



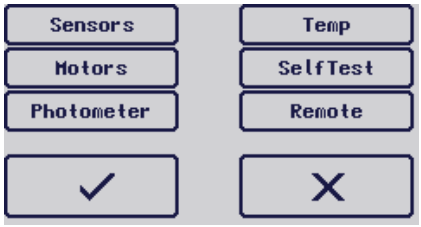

Enter the password. The default setting is 3030.
Confirm with ↵

4. Service menu



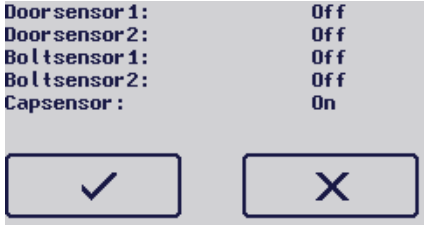

Touch **Tests** to get to the tests menu ✓

5. Tests menu




Touch **Sensor** (or **Motors** or other touch buttons) to get to the preferred menu

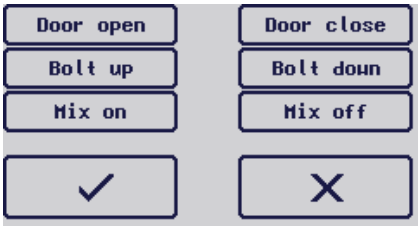
6. Test sensors menu




Read the status of the sensors.
Confirm with ✓

see details on page 7

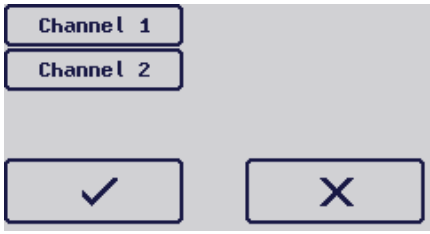
7. Test motors menu




Touch button to perform preferred test. Confirm with ✓

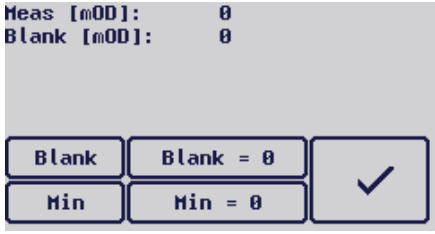
see details on page 8

8. Channel selection menu




If **photometer** in test menu is selected, the channel selection menu appears. Touch button to select channel.

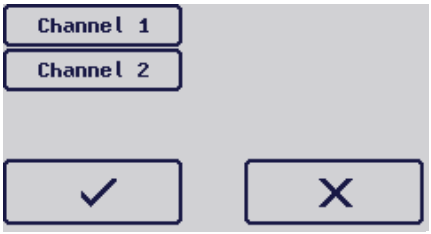
9. Test photometer menu




Read photometer values and confirm with ✓

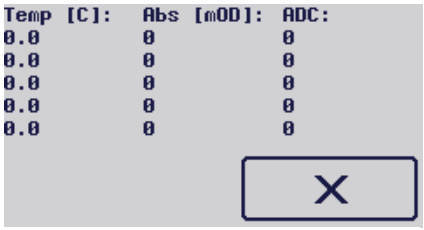
see details on page 9

10. Channel selection menu




If **temp** in test menu is selected, the channel selection menu appears. Touch button to select channel.

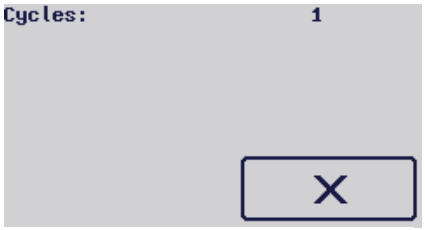
11. Test temperature menu




Read temperature of photometer and AD converter values. Finish with ✗

see details on page 10

12. Self test menu



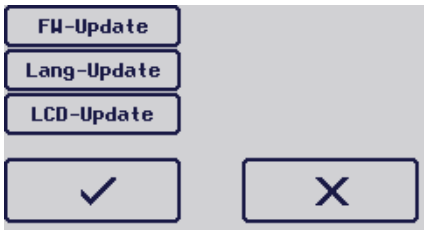

If **self test** is selected in the test menu the instrument automatically performs a self test. The finished test cycles are displayed. End procedure with ✗

see details on page 11

13. Remote control menu

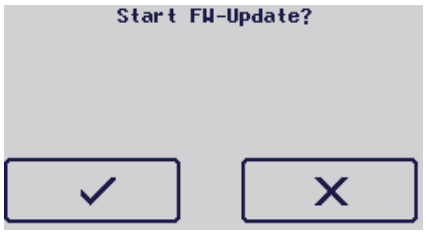
If **remote** is selected in the test menu the instrument is ready to receive remote commands (no application as of now available)

14. Update menu




If **updates** is selected in the service menu the update menu is displayed. Press button to perform desired action. Confirm with ✓

15. FW-Update menu

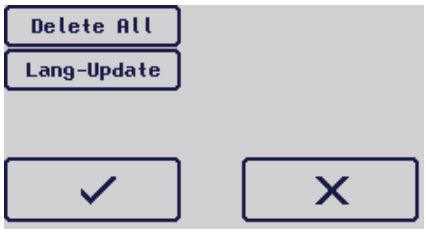



Confirm with ✓, the boot loader menu appears

16. Boot loader menu

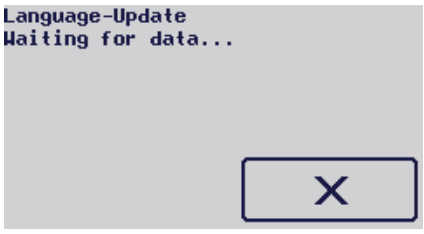
Instrument is ready for FW update. Start update from a PC according to FW update instructions. (see Eurolyser homepage for instructions)

17. Language-Update menu



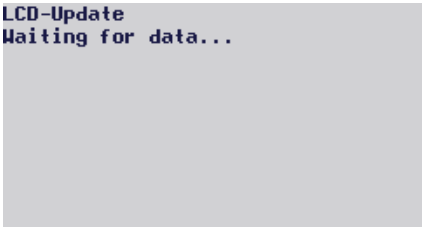

If **Lang-update** is selected in the updates menu the language update menu is displayed. Press button to perform desired action. Confirm with ✓

18. Language-Update status menu




Instrument is ready for language update. Start update from a PC according to language update instructions. (not active)

19. LCD-Update status menu




If **LCD-update** is selected in the updates menu the LCD update status menu is displayed.
Instrument is ready for LCD update. Start update from a PC according to LCD update instructions. (not active)

## Test sensors menu

### Doorsensor1:

Type of sensor: magnetic hall senor
State: On .. door is closed
Off .. door is not closed

### Doorsensor2:

Type of sensor: magnetic hall sensor
State: On .. door is completely open
Off .. door is not completely open

### Boltsensor1:

Type of sensor: optical senor
State: On .. bolt is in top position
Off .. bolt is not in top position

### Boltsensor2:

Type of sensor: optical senor
State: On .. bolt is in bottom position
Off .. bolt is not in bottom position

### Cap sensor:

Type of sensor: optical senor
State: On .. cartridge with cap is in measurement position
Off .. no cartridge with cap is in measurement position

## Test motors menu

| | |
|---|---|
| **Door open:** | door is opened |
| Precondition: | bolt is in top position |
| **Door close:** | door is closed |
| Precondition: | bolt is in top position |
| **Bolt up:** | bolt moves to top position |
| Precondition: | none |
| **Bolt down:** | bolt moves to bottom position |
| Precondition: | door is closed |
| **Mix on:** | mix motor is switched on |
| Precondition: | none |
| **Mix off:** | mix motor is switched off |
| Precondition: | none |

## Test photometer menu

| | |
|---|---|
| **Meas [mOD]:** | current measvalue (blank value is subtracted) |
| Range: | > 10 mOD and < 1000 mOD without a cartridge inserted (for blank value = 0) |
| **Blank [mOD]:** | blank value |
| **Blank:** | sets the blank value to the current measvalue |
| **Blank = 0:** | sets the blank value to zero |
| **Min:** | performs a minimum measurement |
| **Min = 0:** | sets the minimum value to zero |

## Test temperature menu

| | |
|---|---|
| **Temp [C]:** | current temperature |
| Range: | > 35 °C and < 39 °C if warm-up is finished (about 15 min after power-on) |
| **Abs [mOD]:** | current photometric measvalue |
| Range: | > 10 mOD and < 1000 mOD without a cartridge inserted |
| **ADC:** | current analog-digital-conversion-value of photometric sensor |

## Self test menu

The following sequence is performed until either an error occurs or the test is stopped.

Close door
Wait 1 sec
Move bolt down
Wait 1 sec
Switch mix motor on
Wait 1 sec
Switch mix motor off
Wait 1 sec
Move bolt up
Wait 1 sec
Open door
Wait 1 sec
Close door

One of the following messages is displayed in case of an error occurs during the self test:

| | |
|---|---|
| Error occurred: | Door close |
| Error occurred: | Door open |
| Error occurred: | Bolt up |
| Error occurred: | Bolt down |

# TECHNICAL SPECIFICATIONS

**smart laboratory photometer**

| | |
|---|---|
| resolution photometer | 0,0001 ABS |
| reproducibility | <1,5% CV at 1 OD |
| linearity | 0.1000 – 3.0000 OD better than +/- 1,5% and +/- 0,01 OD |
| temperature control | electrical temperature control of the photometer unit 37°C +- 2°C |
| display | standard LDC display with back light and integrated touch panel |
| buffer battery | BR2032 |
| fuse | 2,5 ampere, self-healing |
| size | 26,0 x 14,5 x 14,0 cm (H x B x T) |
| weight | 3,5 kg (unpacked) |
| communication interface | RS232, USB |
| operating conditions | temperature : 15 - 28°C<br>relative humidity: 10 – 90 % |
| storage conditions | temperature: 0 – 50°C<br>relative humidity: 5 – 95 % |
| location | dry, clean, horizontal surface. Avoid direct sunlight |

**Power supply**

| | | ***Or*** |
|---|---|---|
| Manufacturer | Mascot | Globtek |
| Type | 9921 | GTM21097-5012 |
| Mains adapter | separate AC to DC mains adapter, double insulated | |
| Primary voltage (input) | 100-230V AC, 50-60 Hz | 90-264V AC, 47-63 Hz |
| Secondary voltage (output) | 12 V DC, 3A | 12 VDC, 4.17A |
| power usage | max. 30 VA | max. 30 VA |

**Options**

| | |
|---|---|
| **thermo printer** | Seiko DPU-414 |
| interface | serial |
| mains adapter | 100-240 VAC |
| **barcode reader** | Datalogic Touch65 |
| reading distance | 63mm |
| max. resolution | 0.10mm (4mils) |
| mains adapter | 100-240 VAC |
| **IP- class** | IP - class III |

# DECLARATION OF CONFORMITY

CE

**Conformity to the IVD directive**

The Eurolyser SMART laboratory photometer meets all provisions in the directive 98/79/EC on ***In Vitro*** Diagonstic Medical Devices and is CE marked accordingly

**Safety Standards**

The Eurolyser SMART laboratory photometer is tested and conforms to the safety standards IEC/EN 61010-1, IEC/EN 61010-2081 and IEC/EN 61010-2-101, and to the EMC standard IEC/EN 61326